with coarse confluent punctures, over three times as long as broad, not quite reaching end of disk. Mesopleurae much elongated and separating the middle coxae far from anterior, longitudinally striate, smoother below, the mesosternum with a fine median carina. Metapleurae also striate. Propodeum longer than scutellum, not as long as width of head, its neck with two prominent carinae dorsally, the sides rugose and pubescent. Wings clear but the pubescence and cilia dark like the veins, radial cell closed, 4.8 times as long as broad, the marginal vein prolonged beyond apex of radial cell, cubitus partly formed, areolet absent. Legs long and slender; segments of front leg as (coxa) 18 : 9 : 38 : 26 : 61 (= 26 + 13 + 9 + 5 + 8); of hind leg as (coxa) 29 (9) : 9 : 43 : 61 : 84 (=42 + 17 + 12 + 5 + 8); claws fine, simple. Petiole cylindrical, slightly carinate on sides, dull, longitudinally striate, 11.5 times as long as broad, shorter than rest of abdomen, which is somewhat compressed laterally, second tergite largest, bare at base, without punctures; lengths of tergites along dorsal curvature as (petiole) 69 (6) : 73 : 26 : 2 : 9. Using the width of the head as a base the length of mesonotum ratio is 1.4, wing 5.1, antenna 6.1. Length 3.5 mm. Antenna 3.55 mm. Wing 2.95 mm.

Described from two specimens from Coroico, Bolivia. Type and paratype in the Zoological Museum in Berlin. Wing, antenna and legs from one side of the type in balsam on slide in U. S. N. M.

A NEW SPECIES OF TERMITE, RETICULITERMES ARENINCOLA, FROM THE SAND DUNES OF INDIANA AND MICHIGAN, ALONG THE SHORES OF LAKE MICHIGAN.

By Eugene J. Goellner, *Department of Zoology, University of Chicago.*

The eastern species of termite, *Reticulitermes flavipes* Kollar, had been always considered to occur in the Indiana dunes along the southern shore of Lake Michigan. In 1929 Park[1] reported the western species, *Reticulitermes tibialis* Banks, from this region. A study of the distribution of these two species of termites was undertaken in the fall of 1930. At the very outset of the investigation, the species considered in the past as *Reticulitermes flavipes* Kollar exhibited such morphological differences from the eastern species as to warrant describing it as a new species.

According to present knowledge, *Reticulitermes arenicola* sp. n. appears to be typically an inhabitant of sandy places. It occurs side by side with *Reticulitermes tibialis* Banks in the Indiana sand dunes.

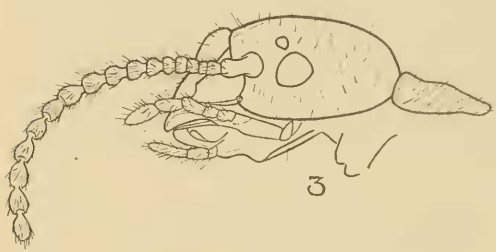
A few records of it were obtained from the dunes of Western Michigan, from the Indiana border to New Buffalo, at Stevens-

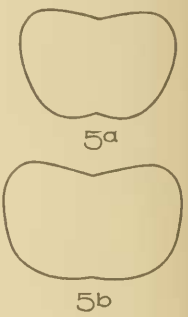
[1]The author is indebted to Dr. Alfred E. Emerson of the University of Chicago, under whom the work was done, and to Dr. T. E. Snyder of the U. S. Department of Agriculture.

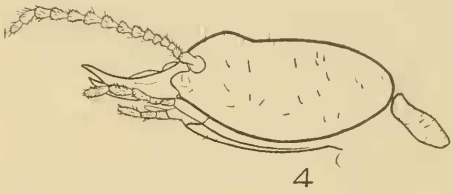
ville and Grand Haven. Collecting was carried on in Michigan chiefly to establish the presence of *Reticulitermes tibialis* Banks in that State.

Reticulitermes flavipes Kollar was taken in the dunes only at Saugatuck and Grand Haven, Michigan; but not in the Indiana dunes. It occurred, however, in other localities in Indiana where mesophytism prevailed.

The colonizing flights of *Reticulitermes arenincola* sp. n. occur toward the end of May.







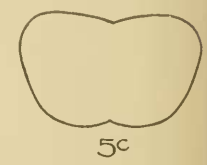


Fig. 3. Side view of head of sexual alate adult of *R. arenincola.*

Fig. 4. Side view of head of soldier of same species.

Fig. 5a. *R. arenincola*, dorsal view of pronotum of first form reproductive individual. b. *R. flavipes* Kollar, variant from Arkansas, dorsal view pronotum, first form reproductive individual. c, Pronotum typical *R. flavipes*, first form reproductive individual.

Morphology of **Reticulitermes arenincola,** sp. n.

Diagnoses.

Winged imago.—Smaller than *R. flavipes*, ocelli less than their diameter from the eye (in *R. flavipes* ocelli are more than their diameter from the eye); smaller than the variant from Arkansas (2); differs in color and total length from *R. hageni* Banks; these being brown to blackish brown and from 9 to 10 mm. in length for *R. arenincola* sp. n., and pale brownish yellow and 8 mm. in length for *R. hageni* : differs from *R. virginicus* Banks also, in total length and with respect to the distance of ocellus from the eye (length of *R. virginicus* hardly 8 mm..

ocellus closer to the eye than in *R. arenincola* sp. n : the shiny black color and dark tibia of *R. tibialis* separate this termite from the new species : the pronotum of *R. claripennis* Banks is relatively wider than that of *R. arenincola* sp. n.; the pronotum of the new species is also relatively narrower than that of the other species. Compare pronotum of *R. flavipes* (Fig. 5c), of variant of *R. flavipes* from Arkansas (Fig. 5b), of *R. arenincola* sp. n. (Fig. 5a).

Soldier.—Smaller than *R. flavipes*, sides of head about parallel (Fig. 2); minimum width of gula much narrower than maximum width; for field characters of the *R. tibialis*, *R. flavipes*, *R. arenincola* sp. n., soldier see Table 1 : resembles the soldiers of *R. virginicus* and *R. hageni* in size.

Worker.—Smaller than *R. flavipes*, whitish, length from 4.12 to 5.02 mm. abdomen and head narrower than in *R. flavipes*, head width from .947 to 1.00 mm. ; length of head and mandibles 1.28 mm.

Description of **Reticulitermes arenincola,** sp. n., winged imago.

Imago.—Vertex and front brownish black, occiput lighter, pronotum a trifle lighter than head; anterior half of clypeus whitish, posterior half yellowish

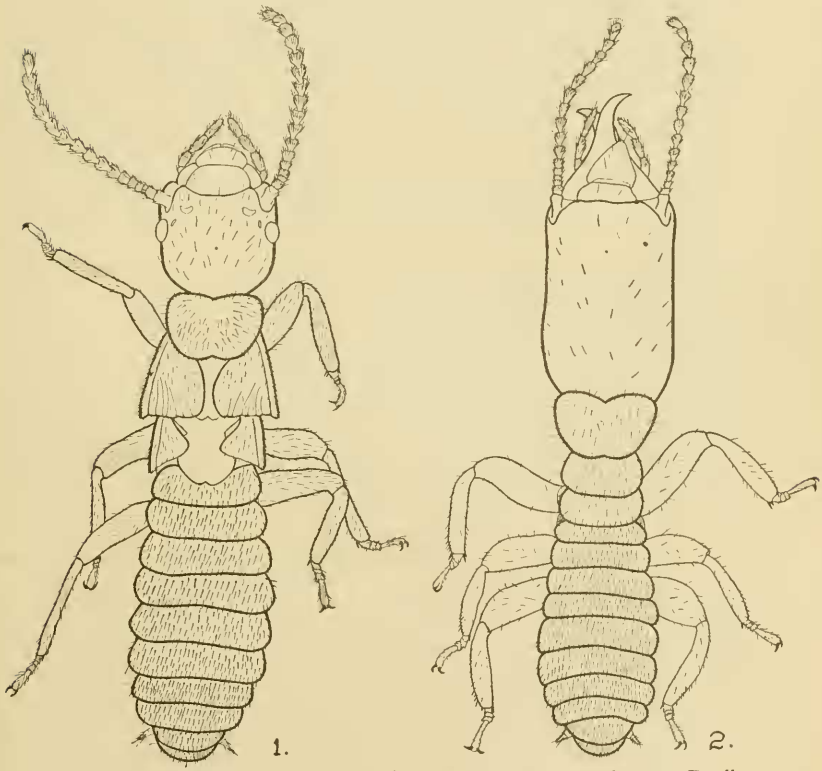


Fig. 1. Dorsal view, dealated adult of *Reticulitermes arenincola* n. sp. Doellner.
Fig. 2. Dorsal view, soldier of same species.

brown; anterior halves of mesa- and metanotum lighter brown than posterior halves, with a blackish irregular line across the medial constrictions : first five abdominal terga about the color of pronotum, the other darker, shades of color, however, variable; femora almost an olive brown; tibia and tarsi a pale yellowish white; color of wings variable, white to dusky.

Head (Fig. 1) not strongly hairy; sterna strongly hairy with a row of a few large hairs at the posterior margin; pleural membrane of female covered with a thick coat of brownish hair.

Length of hair from posterior margin to clypeal suture a little shorter than width behind eyes; sides about parallel rounding with a broadly convex posterior margin beginning a little behind the eyes.

Sutures of head, except the longitudinal suture, not visible; fontenelle present, not prominent, at about the level of the posterior margin of the eyes.

Labium very pale; labial palpi and first four maxillary palpi slightly browned.

Gula about the color of the pronotum; anterior tip white, about .066 mm. in length; gula longer than wide, slightly narrowing distally at end of pigmented area; surface of gula slightly bulging posteriorly, flat anteriorly.

Clypeus, posterior margin wider than anterior and slightly convex; length measured along the medial line about one half as long as greatest width; suture invisible in the middle of the brownish, posterior part of labrum; posterior pigmented area swollen and higher than anterior limits of frons; pigmented area about .103 mm. in length.

Labrum a little wider than long; greatest width about .08 mm. from proximal end.

Antennae spots visible, less than half their width from the ocelli and slightly crescentic in shape; long axis parallel with width of head; posterior margin rounded.

Ocelli hyaline, less than their diameter from the eye; antero-ventral side flattened, postero-dorsal side rounded.

Eyes triangular in shape with rounded angles; altitude about .199 mm.; sides of triangle tend to be equal in length.

Pronotum slightly narrower than head; anterior margin raised and slightly biconvex; median notch distinct; antero-lateral angles rounded, viewed dorsally; antero-lateral border reflexed; lateral margin not receding strongly toward biconvex posterior margin. T-shaped area clearly visible.

Antennae, 17 segments; first segment longest, over twice as long as broad, widest near distal end; third segment smallest.

Measurements of an Imago, *Reticulitermes arenincola*, sp. n.

Length without wings	4.16 – 5.30 mm.
Length with wings	9.00 –10.00
Width of abdomen	.91 – 1.10
Head, length to clypeus	.770
" width behind eyes	.81 – .90
" length to tip of labrum	1.09 – 1.24
Gula, length	.359
" length of white anterior margin	.066
" width, maximum	.311

Gula, width, minimum anterior	.244
Labrum, length	.311
" width	.355
Clypeus, posterior width	.444
" anterior width	.311
" length measured along medial line	.213
Crescentic antennae spot, width	.06 – .08
" " " distance between tip of the two horns	.133– .155
Ocelli, length	.080
" width	.059
Eyes, altitude of triangle	.199
Pronotum, ant. max. width	.71 – .77
" length	.51 – .56
Antennae, length	2.443
1st segment, length	.222
" " greatest ant. width	.055
3d segment, length	.044
Cerci, length	.044
" " apical segment	.079
Forewing, length to suture	6.720
Hindwing, length to suture	6.400
Forewing, width	1.737

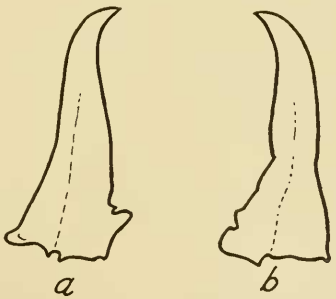


FIG. 6.

Fig. 6 a. *R. arenincola*, soldier, left mandible. b. Right mandible of same.

Description of **Reticulitermes arenincola**, sp. n., Soldier.

Head pale yellow, paler beneath, mandibles dark brown, antennae yellowish, pronotum and remainder of body with small brownish yellow hairs.

Hairs of head scattered; head not strongly pilose; abdomen strongly pilose, with a single row of a few large hairs, some erect, near margin of sterna; hairs of tibia directed posteriorly, on distal half more spine-like, three such spines on apical ends of prothoracic tibia, two such spines on the other.

Head elongate, without mandibles less than twice as long as broad, posterior margin broadly rounded, sides parallel, anterior and posterior widths not noticeably different; fontanelle not prominent but distinct; head viewed from side

shows frons bulging and sloping toward clypeus; ventral surface slightly convex, gently curving upward to mandibulate articulation; on the whole tends to be parallel with the dorsal surface posterior to fontennelle; frons biconvex with a shallow median depression.

Clypeus overlapping labrum a little (this condition not frequent); broader than long; anterior margin straight; sides posteriorly almost parallel to middle of clypeus, then strongly receding; in others lateral margins slope gently inwardly to the anterior margin.

Labrum narrowing distally to a slightly rounded hyaline tip with two long hairs pointing forward; length of labrum measured from end of clypeus about the size of greatest width near base of labrum.

Eyes and ocelli suggested by round hyaline spots where such organs are located in the first form reproductive individuals.

Antennae: 14 to 16 segments; segments 2, 3, 4, not constant; first segment longest, cylindrical, little less than twice as long as broad, broader anteriorly and posteriorly; second segment a little longer than wide; third segment sometimes smaller than the rest; the remainder increasingly larger to about the eighth segment; segments 2, 3, 4, occasionally approximate one another in size so as to form a rather distinct antennae section; the last segment somewhat ovate and narrower than the preceding.

Gula narrows posteriorly, maximum width more than twice the minimum width.

Mandibles shorter than the length of head, right a little longer than the left; external and internal border of right mandible rather straight, a slight concavity posterior to the distal half of the external edge; tip pointed and curved about at right angles to the long axis; left mandible, external margin beginning at a distance one-fourth the mandibular length from proximal end, straight; tip as in right mandible; inner edge not straight but sloping to tip with a slightly ventral flexure of blade near the distal end.

Pronotum, anterior margin biconvex, in some weakly so, notch sometimes pronounced; antero-lateral corners not broadly rounded, lateral margins do not recede rapidly toward the slightly biconvex posterior margin from the antero-lateral corners; notch in the middle of posterior margin either slight or pronounced, usually the former.

Cerci, base broad, second segments longer and pointed; styles shape of apical segments of cerci, thinner and a little shorter.

Measurements of a soldier, *Reticulitermes arenincola*, sp. n.

Length, total	4.660–4.940	mm.
Head and mandibles, length	2.280–2.560	
Head to clypeal suture, length	1.559	
Head width, maximum posterior	.94 –1.09	
Fontanelle, distance from clypeal suture	.422	
Labrum, length	.333	
Clypeus, posterior width	.399	
" anterior width	.177	
Antenna, length (16 segments)	1.463	
First segment, length	.155	

First segment, maximum anterior width	.097
Second segment, length	.088
" " width	.060
Pronotum, width (not removed and flattened)	.731- .870
" length	.459- .574
Gula, length	1.119
" max. width	.402- .460
" min. width	.152- .180
Mandibles, left, length	.888
" right, length	.933
" right, max. width	.162
Cerci, length	.133

Type locality.—Pine, Indiana, several miles west of Gary, Indiana.

Range.—From Buffington eastward along the dunes to Michigan City, Indiana; thence northward along the dunes of Western Michigan to Grand Haven.

Described from several winged imagos and soldiers from a large colony collected at Pine, Indiana. The range in some measurements has been computed from specimens collected in the Indiana and Michigan dunes. Material preserved in 80% alcohol.

Type material deposited with the A. E. Emerson Collection at the University of Chicago.

Field Characteristics of Reticulitermes Species, *R. tibialis* Banks, *R. arenincola* sp. n., *R. flavipes* Kollar, Using Soldier Caste.

The identification of *R. tibialis* Banks, *R. flavipes* Kollar, and *R. arenincola* sp. n. by means of the soldier caste greatly facilitated the work in as much as it was possible to identify each colony in the field at sight without having recourse to Light's (3) new method of differentiating species by the soldier caste in terms of indices or mathematical expressions of relative proportions between parts or sizes of parts. Recourse to this new method, one that presents a laboratory problem, would be necessary were the identification of *R. arenincola* sp. n. and such species as *R. virginicus* Banks and *R. hageni* Banks in question. Reliable field characters of each species (soldier caste) occurring in the Chicago vicinity[1] are to be found in the table below. They permit identification of the colony in the absence of winged first reproductive forms. The color of head and the relatively wide minimum width of the gula of *R. tibialis* had been mentioned by Banks and Snyder (4).

[1]Chicago vicinity: The dune regions in Indiana and Michigan.

Table I.

	R. tibialis	*R. flavipes*	*R. arenincola*
1. Color of head	Dull brownish	Pale yellow	Pale yellow
2. Minimum width of gula	Wider than that of the other two species—from .228 to .289 mm.	Narrower than preceding—from .18 to .28 mm.	Narrower than that of tibialis from .15 to .18 mm., approaching in some cases .228 mm.
3. Head and mandibles (length)	Variable, but of no diagnostic value	Large, from 2.65 to 3.20 mm.	Small, from 2.285 to 2.56 mm.

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MINUTES OF THE 431st REGULAR MEETING OF THE ENTOMOLOGICAL SOCIETY OF WASHINGTON.

The 431st regular meeting of the Entomological Society of Washington wa held at 8 p. m. Thursday, October 1, in Room 43 of the new building of the National Museum. In the absence of Dr. A. C. Baker, President, Mr. F. C. Bishopp, first Vice-President, presided. There were present 49 members and 41 visitors. The minutes of the previous meeting were read and approved. The following individuals were admitted to membership by vote of the Society: Argyle B. Proper, Gypsy Moth Laboratory, 1156 Main St., Melrose Highlands, Mass.; Stansbury Hayden, care of Maryland Academy of Sciences, Baltimore, Md.; R. W. Wagner, University of Maryland, College Park, Md.; Dr. Alan Stone, Foster H. Benjamin, Miss Kathleen McClure, Miss Irene L. Bartlett, Miss Catherine Ford, Dr. H. H. Richardson, S. W. Simmons, U. C. Lofton and Dr. Wm. Robinson, U. S. Bureau of Entomology. The Recording-Secretary, Mr. Rohwer, requested more prompt payment of dues on part of all